

Finally, there are substantial differences between the ethical issues raised by phase one drug trials, which are conducted with healthy people, and phase two and phase three trials which involve people who are sick with the illness or condition under study. The ethical issues involving placebo use, for example, only arise in later phase trials.

These may not be fair criticisms of a book intended to be descriptive rather than prescriptive, but someone considering this book as an instructional tool must be warned that the result may be to leave the reader with a series of horror stories, rather than a coherent understanding of the underlying ethical issues involved when people trained in science and medicine go to another country not to provide care but

to acquire commercially valuable information. To say that this book sometimes ignores shades of gray in order to tell its stories is not to say that there aren't serious ethical and legal concerns arising from international research. The information presented in this book is interesting and important, and it will provoke lively discussion in any classroom. However, the information is presented with a strong bias against the pharmaceutical industry and thus needs to be balanced both with a more detailed and nuanced study of the ethical pitfalls in all human subject research, and a description of how those pitfalls are magnified when the research is conducted in countries with little or no tradition of protecting subjects of medical research.

Review of Barry Kellman, *Bioviolence: Preventing Biological Terror and Crime*¹

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Barry Kellman's *Bioviolence: Preventing Biological Terror and Crime* is unique among the growing crop of volumes warning of the threat of biological weapons, in its combination of erudition, sobering analysis, passionate advocacy, and international focus. The richness of this book is partially due to Kellman's decision to address the broad topic of "bioviolence" – "the infliction of harm by the intentional manipulation of living micro-organisms or their natural products for hostile purposes" (1) – rather than limiting his focus to either State-sponsored biological weapons (BW) development, or bioterrorism by non-State actors.

The first section of the book presents the case for why bioviolence should be taken seriously as a paramount threat to global health and security. The introductory chapter argues that BW are distinctive in their resemblance to naturally occurring pathogens, potential for creating self-propagating epidemics with massive death tolls, and ease of manufacture and delivery. The following chapter reviews the agents most likely to be developed into biological weapons, as well as the role of emerging scientific advances in the modification or synthesis of new agents. The final chapter in the section reviews past and current state bioweapons programs, including Japan's Unit 731, South Africa's Project Coast, and American, Soviet, Egyptian, Iraqi, and Israeli programs; as well as current terrorist groups' interest in BW. The latter section focuses primarily on Al Qaeda's attempts to develop or acquire BW, and their rhetorical justifications for such use.

While these chapters offer little new information, they are a succinct and comprehensive compendium of past, cur-

rent, and future threats. Kellman's discussion is balanced throughout, and he is careful to hedge where appropriate. For example, before discussing new developments in molecular biology, synthetic genomics, and nanotechnology, he cautions that "scientific advances certainly thicken the fog of bioviolence prevention, but less certain is whether we should fear Frankensteins lurking in the shadows" (48). Kellman also notes the limitations of relying on open-source information. Unlike many biodefense advocates, he acknowledges that most bioweapons-related information is currently classified, and what is available is often the subject of considerable debate.

Despite these cautions, these initial chapters leave the reader with the overall impression of extreme vulnerability in the face of a considerable threat of bioviolence. States have successfully weaponized pathogens in the past, continue to do so, and will capitalize on scientific advances to produce more dangerous agents in the future. Non-state actors appear increasingly likely to overcome the technological hurdles that prevented successful acquisition or development of BW in the past. Kellman has amassed considerable evidence in support of his contention that "bioweapons are far more available, cheaper, easier to use, undetectable, and could have more widespread and long-lasting effects. If you want to stop modern civilization in its tracks, bioviolence is the way to go" (18).

The second section of the book presents his "Global Strategy for Preventing Bioviolence." In the opening chapter, Kellman surveys the sorry state of current bioviolence

1. New York, Cambridge University Press, 2007, \$28.00.

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prevention efforts: too little is being done to restrict access to dangerous pathogens and technologies; law enforcement officials are ill-equipped to investigate bioviolence in the absence of specific legal prohibitions; inequitable distribution of bioscience resources leaves developing nations incapable of instituting prevention measures; and, most importantly, there is little if any international cooperation to address this ultimately global threat. He also lists challenges to prevention efforts: the dual-use dilemma (legitimate biomedical research and BW development often require the same agents, equipment, and skills), which renders outright prohibition of research impossible; the difficulty of coordinating between law enforcement, national security institutions, and disparate scientific disciplines in the public and private sectors; the velocity of bioscientific progress, which consistently outpaces implementation of security standards and incremental changes in law; and competition with other health and security policy priorities.

Kellman's prevention strategy starts by classifying bioviolence as a crime against humanity – "the clearest and most forceful articulation of a prohibitory norm" (94). This prohibition forces states to categorically renounce BW development, and to institute detection mechanisms and establish penalties for bioviolence. Succeeding chapters outline the four mutually reinforcing elements of his strategy (complication, resistance, preparedness, and nonproliferation), and a United Nations-based mechanism for global governance.

A professor of international law at DePaul University, Kellman is most original and convincing when he discusses the need for a comprehensive, international legal framework to deter bioviolence. In the chapter on "complication," Kellman cites the "systematic failure to clarify and enforce even rudimentary legal obligations that could make it harder to commit bioviolence" (103). He suggests "denial" measures to make it difficult to obtain dangerous materials, including registration and licensing of scientists working with select pathogens and equipment; tracking of these pathogens (through DNA marking) and equipment (through GPS tags); and reinforcement of security and accounting measures at registered laboratories. These would be coupled with "interdiction" measures to track and investigate illegitimate diversions of pathogens or equipment, including data mining, packaging and labeling, and counter-smuggling operations. Some thorny questions are glossed over – most notably, precisely who will determine which behaviors, materials, individuals, and institutions are 'legitimate,' and precisely how non-complying states or institutions can be persuaded to give up substantial short-term advantages in order to comply with international standards. Nevertheless, Kellman's discussion is thorough, balanced, and sensitive to the need to ensure responsible, secure conduct of science without presenting undue burdens that may discourage or impede legitimate scientific research.

Kellman's chapters on nonproliferation and global governance are similarly strong. His nonproliferation strategy features a resuscitated Biological Weapons Convention, with clear procedures for defining bioweapons and distin-

guishing between legitimate and illegitimate research programs, guided by a principle of "translucency" – the absolute prohibition of secret research that might contribute to bioviolence – whose goal is to render the *existence* of sensitive research visible, while allowing the specific *contents* of that research to remain classified. This would both reduce suspicion that State programs are offensive in nature, and prevent dangerous information from falling into the wrong hands.

In his penultimate chapter, Kellman proposes the creation of three new United Nations agencies as a global governance structure to address the common threat to humanity presented by bioviolence. A Commission on Bioscience and Security would promote and manage responsible bioscience by linking scientific development to bioviolence prevention. A Bioviolence Prevention Office would develop new prevention strategies, coordinate extant efforts, and track potential problems. Finally, a Bioviolence Committee of the Security Council would investigate suspected violations of the BWC and respond to instances of bioviolence. Kellman is particularly sensitive to the demands of distributive justice in a world marked by enormous disparities in health and access to technological and financial resources, advocating a "global covenant" (224) that mandates common responsibilities, but distributes burdens according to national wealth and capability. This is a rare trait among biosecurity advocates, who too often view the world through a Manichean lens that divides actors into basically good technological haves and potentially evil technological have-nots.

Kellman's desire for comprehensiveness leads him to stray from his primary focus on legal frameworks in his comparatively weak chapters on 'resistance' and 'preparedness.' These present familiar and generally unobjectionable calls for training scientists in ethical conduct; development of vaccines and therapeutics; use of technology to improve security around air filtration and water supply systems; and improvement of public health and law enforcement response capacities in case of an attack. These chapters present few original recommendations, and discussions of major issues are sometimes superficial or abbreviated. For example, he devotes fewer pages to a brief review of quarantine procedures, than to a fascinating discussion of prohibitions on non-lethal bioagents in the succeeding chapter.

Kellman also often shrugs off opposing viewpoints with less-than-adequate consideration, substituting rhetoric for reasoned argument. For example, he dismisses arguments that preparedness should focus on improvement of basic public health infrastructure because, unlike natural disease outbreaks, in the case of bioviolence "the attacker can choose where to pierce society's preparedness – it is preposterously naïve to suppose that a bio-offender will cooperate by choosing a disease that is readily responsive to medical counter-measures and attack where public health is ready to respond" (163). Given Kellman's comfort with proposing global solutions elsewhere, this argument is surprising. Moreover, the same criticism can be leveled against his other strategies: it is preposterously naïve to suppose that a

bio-offender will cooperate by choosing to obtain materials that are closely tracked and where law enforcement conducts robust surveillance.

Similarly, he dismisses arguments that the historical record indicates that terrorist groups are far more likely to use easily-obtainable conventional weapons than sophisticated bioweapons thus: "there is no convincing explanation for why catastrophic bioviolence has not yet occurred – it might be quite wrong to conclude that terrorist groups pose no cause for concern" (80). This is a straw man; few have argued that there is "no cause for concern" – just that this low-probability, high-consequence threat may not justify the

expense and potential negative consequences of counter-measures.

These minor criticisms aside, this is a comprehensive, balanced, and original treatment of a timely and important topic. It is both an excellent introduction for the uninitiated, and a sophisticated discussion for those already familiar with the issues. I could imagine assigning this impressive book to upper-level undergraduates and recommending it to interested policymakers alike, and I recommend it to anyone with an interest in national and international security, the future of the biological sciences, and global governance more generally.